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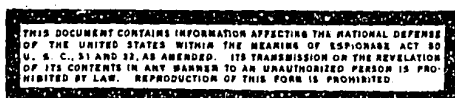
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GERMAN WATERWAY PROJECTS AND THEIR IMPORTANCE  
TO THE IRON AND STEEL INDUSTRY

[Summary: This report presents excerpts from several articles on German waterway projects under way or planned and their importance to the iron and steel industry. Projects discussed include the following: the Dortmund-Ems Canal, the Rhine-Main-Danube waterway, additional connections between the Rhine and the Danube, a North-South Canal, and channeling of the Moselle River.

Numbers in parentheses refer to appended sources.]

Dortmund-Ems Canal

The Dortmund-Ems Canal, opened in 1900, has shown a steady increase in traffic. In the year of its opening, it carried 257,000 tons; in 1950, 6,272,000 tons (of this, 2,519,000 tons of coal and 1,207,000 tons of ore). In addition, the southern section of the canal, from Bergeshoevede to Datteln, carries freight going to or coming from the Mittelland Canal, so that this section of the canal carried a total of about 10 million tons in 1950 and 12 million in 1951. Traffic density on the section between Bergeshoevede and Herbrun in million tons (ton-kilometers divided by length in kilometers) was 7.5 in 1950, a figure exceeded only by the Rhine itself with 14.0 and by the Rhine-Herne Canal with 7.5. In 1951, it is estimated that the total traffic density on the West German waterways increased by 16 to 30 percent, with an increase of 20 percent for the Dortmund-Ems Canal.

The Dortmund-Ems Canal was originally build to connect the heart of the eastern Ruhr with the seaport of Emden, to provide cheap transport of coal to the port and transport of ore from overseas to Dortmund. At the time of the opening of the Dortmund-Ems Canal, the Dortmund region had no waterway connecting it with the Rhine; this connection was made in 1914 by the Rhine-Herne Canal. In addition, the Dortmund-Ems Canal was later connected to the Mittelland Canal at Bergeshoevede, and to the Coastal Canal at Doerpen. It thus acquired an importance which had not been foreseen at the time of its construction. Its southern section especially became the key portion of the West German waterways network.

- 1 -

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While the centralizing effect of the Rhine has caused the share of the western Ruhr in Ruhr pig-iron production to increase from 50 percent at the turn of the century to 60 percent at present, the Dortmund-Ems Canal was undoubtedly the reason for the fact that the eastern Ruhr is still producing 40 percent of the total. About 15 to 40 percent of the total amount of ores imported from overseas moved through Emden via the Dortmund-Ems Canal, and through Bremen via the Coastal Canal which feeds the former. In the other direction, the Dortmund-Ems Canal has been of great value for the sale of Ruhr coal along the North German coast and for export of coal to overseas. It is not possible to trace the total development of traffic between Dortmund and Emden or vice versa through the past 50 years. However, the canal has definitely fulfilled its purpose of enabling the metallurgical industry located away from the Rhine to compete with the industry along that river. It is therefore mandatory that this condition be maintained and that traffic on the Dortmund-Ems Canal be expanded.

The plans for the canal, made about 1890, had taken a certain increase in industrial production into consideration. The capacity, at that time, was computed at 2.25 million tons in each direction. This figure was first reached in 1918, and since then has been more than doubled in the southern section of the canal. Therefore, a number of improvements have been carried out along this section to maintain traffic.

While traffic density on the northern section of the canal was not as high as on the southern section, the traffic of 4.5 million tons exceeded the estimate by more than one third and hampered shipping considerably. Shipping concerns, therefore, were faced by higher costs and placed at a disadvantage in relation to the competing route on the Rhine.

For this reason, improvements for the northern section of the Dortmund-Ems Canal below Muenster were planned in 1930 - 1932. In 1933, it was decided that a parallel canal from Gleesen to Papenburg should be built. The plan also involved straightening of the river and reduction of the number of locks from nine to three. This project was started before World War II, and about 60 percent of the new canal bed was dug. At the time, 40 million Reichsmarks were spent on the project, but work was stopped in 1941 because of the war.

After representations by interested groups from commerce and industry of the region, the Ministry of Transport has now appropriated 75 million Deutsche marks (West) for the most important construction work on the canal to be carried out during the next 5 years. A total of 40 million Deutsche marks of this is earmarked for overdue repair work. The rest of the money is to be used for the reconstruction and improvement of some of the locks between Gleesen and Papenburg and for the renovation of the obsolete sluices in this sector of the canal. Along with this work, the water level is to be raised to permit passage of ships with a draft of up to 2.5 meters.

This project is especially important, as the West German canal fleet at present has about 800,000 tons of barge space built with a draft of 2.0 meters, but which can be loaded only to a draft of 2.0 meters. Raising the water level along this section will increase the capacity of these barges by about 200,000 tons, which will have a marked effect on transport costs and which will alleviate the shortage of barges without necessitating the building of new ones.

This project is already under way; it is expected to be completed in 5 years. In 1950, the Arbeitsgemeinschaft Dortmund-Ems Canal, the group which initiated the above project, termed this the minimum program. At the time the program was approved, the group requested an investigation of means whereby this project could be linked with the ultimate plan of extending the canal for passage of 1,500-ton ships. At the time, the Federal government was forced by lack of funds to shelve this plan, but the situation has become even more acute in

- 2 -

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the meantime, since 1951 traffic was 20 percent above the 1950 volume, and the peak has not yet been reached. During the second half of 1951, the canal was no longer able to handle all traffic, despite the high performance achieved, and a large portion of the material which was originally to have been transported through it had to be shipped by rail instead. It is therefore in the best interests of canal shipping concerns and of the basic industries of West Germany that the Dortmund-Ems Canal be expanded to the capacity demanded by today's traffic conditions. Its development is the most important task in the building of waterways in West Germany. The Verkehrswissenschaftliche Beirat (Transport Advisory Board) of the Federal Ministry of Transport has issued a report in which it agrees with the demands by West German industry in this matter. (1)

#### Rhine-Main-Danube Waterway

In 1921, the original plans for the building of the Rhine-Main-Danube waterway were laid. This was to be a waterway for modern ships, which were to use the channelled Main as far as Bamberg, a canal via Nuernberg to Beilngries, and the channelled Altmuehl to Kelheim on the Danube. Operation of this waterway with 1,350-tons barges, it was hoped, would support and improve German commerce with the Danube states, and also encourage the Bavarian economy, mainly by reducing the cost of coal and iron.

Construction has been started on this project. Until the beginning of World War II, the channeling of the Main from Aschaffenburg to Wuerzburg and a number of construction projects on the Danube from the frontier to Regensburg were carried out within the framework of this plan. The completion of the Main channeling project, which cost 130 million Reichsmarks for a stretch of 165 kilometers, should be a test of the profitability of the undertaking. However, an examination of shipping problems on the Main shows that this is the most sensitive spot in German river shipping. Traffic via Wuerzburg could be maintained only by a tax policy which was very liberal as compared with that in force on the lower Main and Neckar rivers, and by the low rates charged by shippers. So far as the iron and steel industry is concerned, Main shipping never could compete effectively in the transport of raw materials to the Ruhr (the amount of Pagnitz ore used by the Ruhr was small anyway), while it was completely unable to compete for transport of fuel to south German metallurgical industry, especially of coke to Sulzbach and Luitpoldhuetten.

The Main between Wuerzburg and Bamberg is now being channelled. However, in this section the main objects are regulation of the ground water level and generation of electric power, so that the transport aspects of this section are of secondary importance. On the basis of costs prevailing before the war, another 243 million Reichsmarks were required to complete this section after the war. At present, five of the 15 dams to be built have already been completed or are under construction. The completion of this section is thus no longer an issue.

On the other hand, no decision has been reached so far on the other sections of this waterway. These sections link the Main and the Danube. The canal will have to rise 164 meters from the Main to its highest point and drop 60 meters from there to the Danube. The costs for these sections are estimated as follows by Jurisch in "Wasserwege zwischen Rhein und Donau" (Waterways between the Rhine and Danube), Die Wasserwirtschaft, April/May 1950, p 228:

Bamberg-Nuernberg Section: 695 million Deutsche marks (62 kilometers).

Nuernberg-Kelheim Section: 1,110,000,000 Deutsche marks (106 kilometers).

The Muenchen Institut fuer Wirtschaftsforschung (Institute of Economic Research) estimated the cost of this project at "not quite one billion Deutsche marks according to prices prevailing at the beginning of 1950," which would be

- 3 -

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25X1A

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1.6 billion according to present day prices [April 1952]. This estimate arrives at a cost of about 400 million Deutsche marks for the Bamberg-Nuernberg section, or 520 million Deutsche marks according to today's prices. Even if it is assumed that this is a low estimate, traffic on this section would be more expensive than transport on any other German artificial waterway. As a matter of fact, it would be more expensive than rail transport. The project would also not be capable of generating electric current; just the contrary: the more elevated sections of the canal would require extensive pumping, which again increases transport costs.

Encouragement of Bavarian industry and economy by the construction of the Bamberg-Nuernberg Canal would directly depend on savings in transport cost. Since no such savings could be effected, it seems that the minimum of 1.6 million Deutsche marks could be better spent elsewhere in Bavaria, where a great number of industries require modernization or are still suffering from the effects of dismantling.

So far as the effect of this projected canal on ore mining is concerned, it can be said that the small amount of ore found in Bavaria is used by the local metallurgical industry. Shipping these ores to the Ruhr would deprive the south German metallurgical industry of its raw material basis. Furthermore, the Pegnitz ores are inferior; there is little demand for them, and even during the war only very small shipments of this ore were sent to the Ruhr. Thus, any sizable transport of this commodity could never be expected at any time. The canal would also bring no improvement in transport facilities for rolled-steel products from the Ruhr to the South or from south German mills to the North Sea ports. Likewise, it would be an impractical route for the shipment of fuel, especially coke, to south German metallurgical plants. These plants would not shift from rail to water transport, since the latter would involve several re-loadings, which would have an adverse effect on the quality of the coke.

In summary, the channeling of the Main River as far as Bamberg remains a worthwhile project for water utilization and production of electric power, even though it might not be profitable as a transport route. However, the planned canal from Bamberg to Nuernberg is definitely not economical, and should not be built. There are also good reasons for not building the section from Nuernberg to Kelheim. Only an exceptionally great increase in trade between Germany and the Benelux countries, on the one hand, and Czechoslovakia, Hungary, Yugoslavia, and Bulgaria, on the other, would make this project worthwhile. In this case, it would become not a German, but an international project, the cost of which, in view of the previous investments by Germany in this plan, should be borne by the other countries. (2)

#### Other Plans for Connecting the Rhine and Danube

There are two other plans for connecting the Rhine and the Danube. One of them would involve channeling the Neckar River as far as Plochingen, and building a canal from there to Ulm on the Danube. The other plan would link the Bodensee (Lake Constance) with the Danube. Both plans suffer from the same chief shortcoming as the Rhine-Main-Danube project -- the terrain features. For the Mainz-Kelheim route, the Rhine-Main-Danube project would have a length of 581 kilometers, the Rhine-Neckar-Danube project 505 kilometers, and the Bodensee-Danube project 801 kilometers. On the other hand, the distance by rail is only 396 kilometers.

The costs for these projects, according to prewar and wartime estimates, would have been 1,040,000,000 Reichsmarks for the Rhine-Neckar-Danube project, and 815 million Reichsmarks for the Bodensee-Danube project.

- 4 -

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Channeling of the upper Rhine is now being carried out jointly with Switzerland. This project serves primarily for generating electric power. The channeling projects on the Main between Wuerzburg and Bamberg and on the Neckar between Heilbronn and Flochingen, which are now under way, will also make available considerable amounts of electric power. However, the construction and operating costs of the sections of these waterways which would cross the mountains would be unusually high. The channeling of the Neckar will bring certain transport advantages for the Neckar watershed region. Thus, the Main and the Neckar projects have one feature in common. Those sections of the waterways using an existing river which has to be channeled are worth constructing for reasons of water utilization and electric generation, while the sections crossing the divide would involve such technical difficulties and be so uneconomical that these plans should be dropped. The Bamberg-Kelheim section, with a rise of 164 meters and a drop of 60 meters, would require 19 locks over a length of 162 kilometers. The canal linking the Neckar and the Danube would have a rise of 216 meters, for which two shiplifts would be required. In addition, three tunnels with lengths of 2,800, 12,700, and 12,500 meters would have to be built to avoid additional mountain crossings. Thus, about half of the 60 kilometers of the canal would be in tunnels.

These installations would be extremely expensive to build and to maintain. If they could be expected to carry 10-12 million tons of freight per year, they might be economically feasible. However, such a high volume of traffic would be most unlikely on either of the two proposed routes, even if intensive trade with the countries of southeastern Europe were to be resumed. While the industries of the Neckar region are important and large, they are manufacturers of finished products and not basic industries like those of the Ruhr, and would neither require nor ship out freight in sufficient volume. The basic industries of the Upper Palatinate would not be reached by the canal anyway.

A link between the Bodensee and the Danube would have to overcome a rise of 80 meters and a drop of 155 meters. The canal would be 105 kilometers long and would require five shiplifts, three locks, and one tunnel. In this case, too, a sufficiently high volume of traffic to make such a high investment profitable cannot be expected.(3)

#### Plans for North-South Canal

In north Germany, a North-South Canal to link the Mittelland Canal near Braunschweig and the lower Elbe near Hamburg is planned. The available details are not sufficient to give a full picture. Traffic between Hamburg and the Ruhr, however, is characterized by the fact that imports involve mostly food and valuable goods, while most export shipments are made up of finished products of processing industries. The port of Hamburg is in a better position qualitatively, but handles a smaller volume than Bremen and Emden, so far as the Ruhr is concerned. Furthermore, inland waterways are involved to only a small degree in the transport of valuable goods. These are usually not bulk shipments, and thus are more easily transported by rail or truck. It is therefore not likely that this canal would become a very economical transport route.(4)

#### Moselle River Channeling

Another plan which is under discussion at present is the channeling of the Moselle River. The data are now being examined by a commission made up of representatives of the governments and industries of Germany, France, and Luxembourg. The report of the commission has not yet been issued, but it can already be stated that the unfavorable water conditions on the Moselle make this project very difficult. The volume of traffic to be expected will depend to a large degree on the further development of the Coal and Steel Community.(5)

- 5 -

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SOURCES

1. Duesseldorf, Stahl und Eisen. Vol LXXII, No 5, 8 Feb 52
2. Ibid, Vol LXXII, No 8, 10 Apr 52
3. Ibid, Vol LXXII, No 24, 20 Nov 52

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- 6 -

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